TABLE 4.—*Results on drinking fountain with improved nozzle.*

Number of examinations	3
Bacteriological examination:	
Swab—Streptococci positive	0
Water from fountains—	
Streptococci in 100 c. c. positive	0
Bacteria per c. c. average	3
B. coli—	
1 c. c	0
100 c. c	0
Water from building—	
Streptococci in 100 c. c. positive	0
Bacteria per c. c. average	0
B. coli—	
1 c. c	0
100 c. c	0

MECHANICAL FANS.

THEIR USE TO INCREASE THE EFFICIENCY OF FUMIGATING GASES.

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While making experiments at the Boston Quarantine Station to test the penetrating powers of fumigating gases, it was observed that a rat in a certain box (box 1) that had shown no symptoms after one hour exposure to cyanide gas in the room was quickly overcome when a small electric fan was started in order to drive the gas through a window. This incident was the more remarkable as the window was on the opposite side of the room and the fan was on the window sill, driving the gas outside. Although the strength of the gas was being rapidly decreased, the agitation of the air by the fan apparently caused the gas to penetrate rapidly the holes in the box holding the rat.

Experiments were therefore made to investigate the penetration of cyanide gas when mechanically agitated as compared with the same gas under natural conditions. Of these experiments one series may be cited. They were made in a room of 500 cubic feet capacity, practically air-tight, and with a small electric fan (8-inch, delivering 390 cubic feet per minute) in one corner near the ceiling and directed toward the center of the room. The boxes used were intended to imitate the hiding places of rats on shipboard. They may be described as follows:

Box 1.—Air-tight wooden box, 8 by 8 inches by 2 feet, with two partitions 1 inch apart near one end. This end has four 1-inch holes. The middle partition has two 1-inch and two half-inch holes. The

inner partition has two 1-inch, two half-inch, and two three-eighths inch holes.

Box 2.—Same as box 1, with one less 1-inch hole in end and inner partition.

Box 3.—Air-tight wooden box, 4 by 4 inches by 4 feet, with one 2-inch hole near one end. A wire partition confines the rat to closed end.

Box 4.—Same as box 3, except hole is 1 inch instead of 2 inches.

Box 5.—Packing box, 12 by 18 inches by 4 feet. Box is tight except top, which has cracks.

Box 6.—Air-tight wooden box, 6 feet long, 2 inches square at one end and 10 inches square at the other. A wire partition confines rat to small end. There is one 2-inch hole near large end.

All except box 5 have a glass side and were placed near a window, where the effects on the rats could be noted.

One full-grown rat in each box.	Box 1.		Box 2.		Box 3.		Box 4.		Box 5. Final result.	Box 6.	
	Overcome in—	Final result.	Overcome in—	Final result.	Overcome in—	Final result.	Overcome in—	Final result.		Overcome in—	Final result.
4 ounces NaCN per 1,000 cubic feet. 1 hour exposure. Electric fan not running.	49 minutes.	Recovered..	.....	.....	52 minutes.	Recovered..	.....	.....	Box one-fourth full of excelsior. Dead.	.....	
Same.....	41 minutes.	.....do.....	Not affected.	None.....	27 minutes.	Died	.....	.....	Box three-fourths full of excelsior. Not affected.	.....	
4 ounces NaCN per 1,000 cubic feet. 1 hour exposure. Electric fan running.	25 minutes.	Died	28 minutes.	Recovered..	32 minutes.	Recovered..	20 minutes.	Recovered..	Box three-fourths full of excelsior. Dead.	10 minutes.....	Died.
Same.....	24 minutes.	Recovered..	37 minutes.	.....do.....	29 minutes.	Died	45 minutes.	.....do.....	.....do.....	25 minutes.....	Do.
4 ounces NaCN per 1,000 cubic feet. 1½ hours exposure. Electric fan not running.	.....	.....	58 minutes.	.....do.....	.....	.....	1 hour and 5 minutes.	.....do.....	Box three-fourths full of excelsior. Not affected.	Not affected.....	None.
6 ounces NaCN per 1,000 cubic feet. 1 hour exposure. Electric fan not running.	.....	.....	39 minutes.	.....do.....	.....	.....	Not affected.	None.....	.....do.....	.....do.....	Do.

As will be seen, better results were obtained with the fan in one hour than in one and a half hours without the fan, everything else being equal; or, the time being the same, 4 ounces of sodium cyanide with the fan did as well as 6 ounces without it.

Unfortunately no practical method of applying this method to large spaces is known. Attempts have been made to circulate the air in the holds of vessels, using a gasoline-driven air propeller—the aerothrust—and two types of electric fans bringing the current from the quarantine steamer. The air current of the larger electric fan (diameter 15 inches, delivering 1,500 cubic feet per minute) in the average hold of a vessel is relatively about one-thirtieth as strong as that of the 8-inch fan in the small room in which the experiments were conducted. It has been tried repeatedly with some apparent increase of efficiency, but not enough to justify a routine use of the method. The aerothrust, which delivers over 20,000 cubic feet of air per minute, has been placed in the hold and allowed to run during fumigation, using test animals in boxes with varying numbers of one-fourth inch holes. This gave much better results than are ordinarily obtained. In addition the current caused by the aerothrust in the hold rapidly cleared it of gas when the hatch covers were removed.

There are practical difficulties to the routine use of fans during fumigation, but if these are overcome the proceedure will be of considerable value. Electric fans are often found in the living quarters of vessels or in buildings, and when possible these should be used when such places are fumigated.